

***California Energy Commission***

***Distributed Generation Oll***

***Order No 99-1103-11***

# ***Distributed Generation Issues***

***12/6/99***

***Vic Romero***

***San Diego Gas & Electric***

## **Safety is Job 1**

¥Safety is the paramount issue

¥Worker Safety

¥Public Safety

¥Utility high voltage safety philosophy  
based on multi-layer safety approach

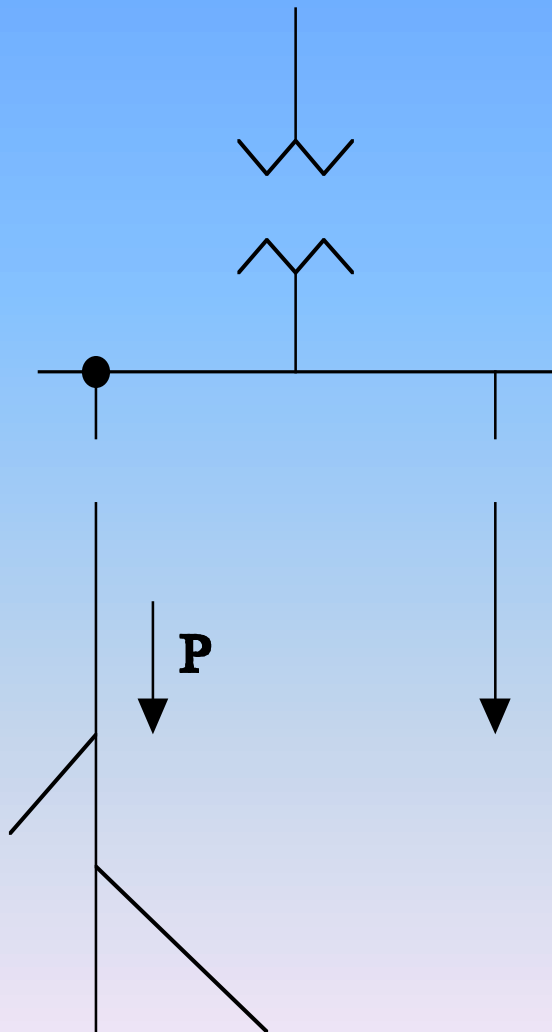
¥Safety can be managed by proper  
interconnection standards

## **Safety Issues**

- ¥Possibility of Backfeed/Islanding
- ¥Equipment fault duty exceeding limits
- ¥Overloaded equipment and conductors
- ¥Fuse/relay coordination
- ¥Reliability and power quality are closely related to safety

# ***Transmission & Distribution System***

## ***Distribution System***



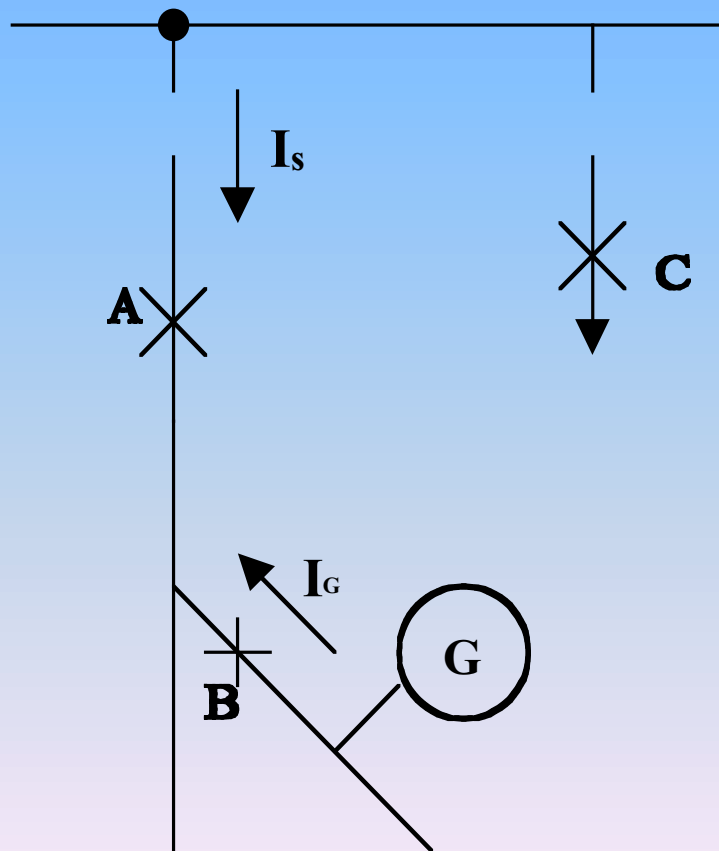
¥ Radial system

¥ Unidirectional power flow

¥ Fault current from bus only

¥ Typical load: 300-600 amps (12 Mw max)

## **Distribution System with DG**



¥ Additional fault current available

¥ Fault current from new direction

¥ Must clear fault at multiple locations

## **Protection Priorities - Utility**

- ¥ Producer clears all faults on Producer equipment
- ¥ Producer isolates for all faults on utility system
- ¥ Producer will not supply islanded utility load
- ¥ Producer will not energize dead bus
- ¥ Producer will not close out-of-sync

## **Priorities - Producer**

- ¥ Minimize costs
- ¥ Expedite approval process- construction and interconnection
- ¥ Streamlined interconnection guidelines
- ¥ Provide protection for all plant equipment
- ¥ Minimize Producer operational issues

## **Mutual Goals for Interconnection Guidelines**

- ¥ Provide for safe, efficient operation
- ¥ Simplify interconnection process
- ¥ Recognize relevant technologies
- ¥ Encourage certification of systems



## **Rule 21 - Interconnection Guidelines**

¥ Interconnection evaluation

¥ Design & Operating requirements

¥ Protection requirements

¥ Addresses transformer and manual disconnects requirements

## **In Summary**

- ¥ Safety must continue to be paramount issue
- ¥ Interconnection evaluation could be streamlined for smaller sizes
- ¥ Concept of pre-certification is viable
- ¥ Safety issues can be managed by mutual cooperation and proper interconnection standards